
ENERGY AND SUSTAINABILITY 2015

OVERVIEW

The 6th International Conference on Energy and Sustainability was held in Medellin, Colombia, organised by the Universidad Pontificia Bolivariana (UPB), Colombia and the Wessex Institute (WIT), UK. The meeting was sponsored by WIT Transactions on Ecology and the Environment, the International Journal of Sustainable Development and Planning, and the International Journal of Energy Production and Management.

The conference Chairs were Professor Whady Florez-Escobar of UPB, Professor Carlos A. Brebbia of WIT, Professor Farid Chejne from the National University in Medellin and Professor Fanor Mondragon from Antioquia University, also in Colombia.

The meeting followed a series of very successful conferences started in 2007 in the New Forest National Park, UK, home of the Wessex Institute.

The choice of Medellin as a location was in response to existing collaboration between the Universidad Pontificia Bolivariana and the Wessex Institute. It was also due to the dynamic and rapid growth of research in Colombia. A significant part of that research focuses on energy matters and the need to respond to the modern world's dependence on conventional fuels.

The world's economy is fuelled by energy. Depletion of resources and severe environmental effects resulting from the continuous use of fossil fuels has motivated an increasing amount of interest in renewable energy resources and the search for sustainable energy policies.

The changes required to progress from an economy mainly focussed on hydrocarbons to one taking advantage of sustainable energy resources requires considerable scientific research, as well as the development of new engineering systems. Energy policies and management are of primary importance to achieve the development of sustainability and need to be consistent with recent advances in energy production and distribution.

In many cases, the challenges lie as much in the conversion from renewable energies (wind, solar, etc) to useful forms (electricity, heat, fuel) at an acceptable cost (including damage to the environment) as in the integration of these resources into an existing infrastructure.

The diverse topics covered by the Conference involve collaboration between different disciplines in order to arrive at optimum solutions, including studies of materials, energy networks, new energy resources, storage solutions, waste to energy systems, smart grids and many others.

OPENING OF THE CONFERENCE

The Conference was opened by Professor Carlos A. Brebbia who expressed his gratitude to the authorities of the Pontificia Bolivariana University for hosting the 6th Energy and Sustainability Conference and, in particular, Professor Father Jorge Ivan Ramirez, Academic Vice Chancellor.



Professor Carlos A. Brebbia opening the conference

Carlos explained that, as originally from South America, he was pleased to participate in a meeting held at this University, named after Simon Bolivar, hoping that one day his dream of a United States of South America becomes a reality.

He also expressed his appreciation to Dr Christopher Banahan, Science and Innovation Secretary of the British Embassy in Bogotá, for making time in his busy schedule to participate in the opening ceremony.

Carlos mentioned that the Conference programme is an important part of WIT objectives. The meetings bring together colleagues from different disciplines from various parts of the world, resulting in transfer of knowledge and setting up of many joint programmes.

Because of its unique features, WIT collaborates rather than competes with other academic research institutions, acting as a focus for many initiatives, including interaction with industries.

WIT's own research capabilities are in the field of computational methods applied to the solution of a wide range of problems. Our focus on industry – Carlos said – has led to our codes being currently used in a variety of industries such as offshore, including renewable energy, pipelines, naval engineering and aerospace. In general, WIT tends to deal with extreme conditions affecting components, structures and systems. The Institute has developed, for instance, unique expertise in the field of fracture and fatigue.

Another important area of knowledge dissemination is through the Institute's publishing arm, WIT Press, which produces digital and paper versions of a large number of books, including Conference Proceedings. As part of this process WIT Press has already started a series of International Journals, the oldest of which, Sustainable Development and Planning, is closely connected with this meeting. The aim of WIT Press is for all publications to be Open Access.

WIT Press also has links with other institutions, acting in collaboration with their University Press, where necessary.

Carlos concluded by emphasising the commitment of WIT to help bring together the international community through a series of prizes and medals, including the Gold Medal in honour of Ilya Prigogine, Nobel Prize winner whose ideas permeate modern concepts of ecology and sustainability. The last of these events took place this year at the Valencia Polytech University with the cooperation of Professor Miralles, who was to deliver the first keynote address of the Conference.

Carlos concluded by stressing his Institute's commitment to help cement links amongst diverse scientists.

Our culture provides the framework for energy management and shapes our behaviour. Any solution needs to be interdisciplinary to account for the simultaneous and reciprocal character of any such activities. Energy problems can also vary in scale, going from the smallest microstructures to the study of very large energy systems.

Father Dr Jorge Ivan Ramirez, Vice Chancellor for Research at the Pontificia Bolivariana University then welcomed the delegates to the meeting.

Father Jorge described the facilities on the Campus and the range of degrees offered by UPB. The University has several campuses and encourages the mobility of research staff and students. UPB has many agreements with difference centres around the world.

They are particularly interested in increasing the research impact of the University by encouraging their staff to publish papers and develop innovative projects.

The University is also closely related to the City with which it has numerous contacts. The City itself has experienced considerable improvement and growth in the last few years, completely shedding away its reputation for a violent place. It received the designation of the Most Innovative City in 2013.

Medellin – Father Jorge said – is experiencing a transformation in terms of planning, poverty eradication, transportation and others, and has now become an example to follow for other Latin American urban centres.

Professor Whady Florez-Escobar of UPB referred to the importance of WIT in his presentation. He graduated there as a PhD and continues to receive support from WIT related researches up to now.

He then explained that sustainable energy is a complex problem which needs to be analysed with reference to all other component parts. Sustainable energy should also be seen in humanistic terms, in addition to technical studies.

Energy is part of our culture, especially in a society which consumes huge amounts of it. Our whole culture is strongly dependent on energy. This dependency may manifest itself in different ways and it is therefore essential to look at the whole problem.

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KEYNOTE ADDRESS

Professor Vladimir Martinez gave a keynote address describing the state of the energy sector in Colombia and Medellin, in particular.

Colombia is the country with the highest proportion of mining resources in the world in proportion to its population. The sector continues to expand and requires controls in order to optimise this output and avoid damaging the environment. Mining is not only carried out by large companies but most of it is micromining, i.e. small enterprises. This situation creates serious problems in terms of sustainability.

The mining and commodities industries in general are a major source of income for Colombia but, in the long term, the best policy is to add value to the products, while at the same time trying to diversify production and exports.

A further keynote address was given by Professor Idi Amin Isaacs-Millan who referred to the Smart City project introduced at UPB for the Medellin region.

The challenge is to achieve the electrification of the whole country which represents a major project. Progress can be achieved by developing micro-plants and linking them together, trying to avoid large complex systems that may become a burden for future generations in terms of maintenance or support.

The plan is to develop a series of renewable resources in the Medellin area such as eolic, photovoltaic and biomass energy generators. The output should be distributed applying intelligent systems.

CONFERENCE TOPICS

The papers presented at the meeting were divided into a series of topics, i.e.

- Renewable energy resources
- Waste to energy
- Biomass and biofuels
- Energy management
- Energy efficiency
- Energy in the built environment
- Sustainable energy production
- Energy and transport
- Case studies

INVITED PRESENTATIONS

The conference programme included a series of keynote addresses delivered by well-known international speakers, i.e.:

“Energy generation by waste incineration: The management of impregnated wood”, **Rolf Sjöblom**, Tekedo AB, Sweden.

“Hydrokinetic turbine location analysis by a local collocation method with Radial Basis Functions for two-dimensional Shallow Water equations”, **Carlos Bustamante**, Universidad Pontificia Bolivariana, Colombia.



Delegates at Lunch

CONFERENCE DINNER

The University offered the delegates a cocktail reception, amongst the many occasions that the participants had for socialising. It took place in the marquee area specially prepared for drinks and coffees located next to the Aula Magna.

The Conference Dinner took place in the very pleasant setting of an Argentine restaurant on the outskirts of Medellin. The place, renowned for its cuisine and meat dishes, also offered a selection of excellent wines, specially selected by the owner and chef. The quality of the food, convivial atmosphere and excellent service made this a unique occasion.

The Vice Chancellor invited the members of the International Scientific Committee to lunch to discuss ways in which their Institutions could collaborate with UPB. The lunch gave the occasion to discuss different possible research projects, including some proposed by WIT. Other projects include joint degrees, research in urbanism, social and political studies, and others.

CLOSING OF THE CONFERENCE

The Conference book is being distributed throughout the world in digital as well as paper format and archived in the eLibrary of the Wessex Institute at www.witpress.com/elibrary, ensuring the maximum dissemination of conference contributions throughout the international community.

Carlos closed the meeting by thanking all participants for their contribution and inviting them to visit the Wessex Institute campus in the New Forest National Park when the occasion arises.

CONFERENCE PROCEEDINGS

The proceedings of Energy and Sustainability 2015 – Energy and Sustainability VI , 558pp (Print ISBN: 978-1-84564-944-9; eISBN: 978-1-84564-945-6) are available from WIT Press. Orders can be placed on the WIT Press web site at www.witpress.com or by email: marketing@witpress.com, telephone: +44 (0) 238 029 3223 or fax: +44 (0) 238 029 2853.

Papers from the conference will also be hosted online at the WIT eLibrary in Volume 195 of WIT Transactions on Ecology and the Environment (ISSN: 1746-448X Digital ISSN: 1743-3541). For more details visit the WIT eLibrary at <http://witpress.com/elibrary>

